MAKEABLE DESIGN

DESIGNING AND SHARING DIY FURNITURE

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Master's Thesis
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Master of Arts thesis abstract

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Abstract

This thesis explores the idea of designing and sharing makeable design. In recent decades the interest in making things by hand has surged in popularity. This is due to the rise of online sharing mechanisms and social media. Sharing DIY projects through different online platforms and communities has enabled some designers and makers to even earn a living with DIY projects, through sponsorships and monetization. People also enjoy making things because it makes them feel happiness and contentment. Taking part in the building process also increases the valuation of the object that was made. This explains why DIY culture is so popular now even though the need to make anything by hand is non-existent.

This thesis documents the process of designing, making and sharing a do-it-yourself general-purpose chair. The findings from benchmarking existing DIY chair designs conclude that a design that has a beautiful but simple design and that is also easy to make is missing from the available designs. Chairs with a cleaner aesthetic have a more complex making process and chairs with a rougher aesthetics have a more simple and quicker making process. The objective of this thesis is to design a chair that combines both easy makeability and beautiful design.

The first prototype of the chair is formed through the process of studying different wood joints, sketching and making scale models. The design process continues with reflecting on the design and makeability of the chair and making necessary changes to it. The making process of the chair is published in a video along with pictures and downloadable and printable template and instructions.

The finished chair has a simple and clean design and it can be made with limited tools and materials. All the materials needed for this chair can be bought from a hardware store. The needed power tools can be paired down to a circular saw, a jigsaw, a battery powered drill and an orbital sander. However, the chair can be made with more advanced woodworking tools or techniques if they are available to the maker. The simple design makes it possible for the maker of the chair to modify the chair according to their needs, available materials and existing tools.

Keywords DIY, Maker Culture, Furniture design, Makeable Design

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Tiivistelmä

Tämä lopputyö tutkii itse valmistettavan designin suunnittelua ja jakamista. Kiinnostus käsin tekemiseen on lisääntynyt voimakkaasti viime vuosikymmeninä. Tähän ovat syynä erilaiset sosiaalisen median kanavat ja mahdollisuudet jakaa tietoa verkossa. Internetin verkostot ja yhteisöt ovat myös mahdollistaneet elannon tienaamisen tee-se-itse-projektien jakamisella käyttäen apuna sponsoreita ja mainostuloja. Suosioon on myös syynä se, että käsityöprojektit lisäävät onnellisuuden ja tyytyväisyyden tunteita. Osallistuminen rakennusprosessiin lisää myös valmiin tuotteen arvostusta. Nämä syyt perustelevat käsillä tekemisen kulttuurin suosiota, vaikkakin nykyään käytännön tarve itse tekemiselle on hävinnyt kokonaan.

Lopputyö dokumentoi tee-se-itse-tuolin suunnittelu-, valmistus – ja julkaisuprosessia. Kartoitus olemassa olevista itse valmistettavista tee-se-itse-tuoleista johtivat päätelmään, että kaunis ja yksinkertainen tuolimalli, joka on myös helppo valmistaa, puuttuu saatavilla olevista tee-se-itse-tuolimalleista. Yksinkertaiset ja puhdaslinjaiset tuolit vaativat monimutkaisemman valmistusprosessin kun taas raa'an ulkoasun omaavat tuolimallit ovat yksinkertaisempia ja nopeampia valmistaa. Tämän lopputyön tavoitteena oli suunnitella tuolimalli, jossa yhdistyvät helppo valmistettavuus ja kaunis muotoilu.

Tuolin ensimmäinen prototyyppi muodostui tutkimalla erilaisia puuliitoksia, luonnostelemalla ja rakentamalla pienoismalleja. Suunnitteluprosessi jatkui tuolimallin muotoilun ja valmistettavuuden pohtimisella, sekä tarvittavien muutoksien tekemisellä muotoon. Tuolin valmistusprosessi julkaistiin videona, kuvina, sekä ladattavina ja tulostettavina valmistuskaavoina.

Valmis tuoli on yksinkertainen ja puhdaslinjainen ja sen voi valmistaa vähillä työkaluilla ja materiaaleilla. Kaikki tarvittavat materiaalit on mahdollista ostaa rautakaupasta. Tuolin valmistamiseen tarvitaan vain katkaisusirkkeli, kuviosaha, akkuporakone ja epäkeskohiomakone. Tuoli voidaan valmistaa edistyneemmillä puuntyöstökoneilla ja tekniikoilla, jos siihen on tuolin tekijällä mahdollisuus. Tuolin yksinkertainen muotoilu mahdollistaa muokkaamisen erilaisten tarpeiden, saatavissa olevin materiaalien ja olemassa olevien työkalujen mukaan.

Avainsanat Tee-se-itse, Kalustesuunnittelu

Minni Sirelä

Makeable Design - Designing and Sharing DIY Furniture

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CONTENTS

INTRODUCTION

"Making something that starts virtual but quickly becomes tactile and usable in the everyday world is satisfying in a way that pure pixels are not. The quest for "reality" ends up with making real things." (Anderson 2012, p. 18)

This thesis explores the idea of creating and sharing makeable design. As opposed to the general way design is produced, in factories and production lines, makeable design is manufactured by the end user. This also means that the designs are not patented, which makes it possible for anyone to make and modify them as they please.

I had three distinctive motives for this topic. Firstly, I wanted to offer an alternative to store bought design pieces. Designer furniture can be very expensive and therefore not available for majority of people. Secondly, I felt that most people have lost their interest and ability to make things. I wanted to inspire people to make more and to discover how satisfying making things really is. And finally, I felt there are not enough well designed furniture designs available for those interested in making. Available makeable designs often look clumsy, disproportionate or structurally weak to me. I wanted to design a piece of furniture that would bring together beautiful design and makeability.

During the process of this thesis I design a chair that can be made with relatively limited tools and materials. The maker can affect how the finished chair will look depending on the tools and materials used in the making process. The chair can be made with as little as just two 1x4's and a piece of laminated wood for the seat without any heavy woodworking equipment. The needed set of power tools can be paired down to a battery powered drill, a miter saw, a jigsaw and an orbital sander.

Before documenting the process of designing this chair, I research about the history of do-it-yourself culture and the different motives for making things by hand in a society where it isn't really necessary in the day-to-day life. I also look at other designers who have designed makeable design and how it has affected their designer careers. I also look at content creation and sharing DIY projects as a career.

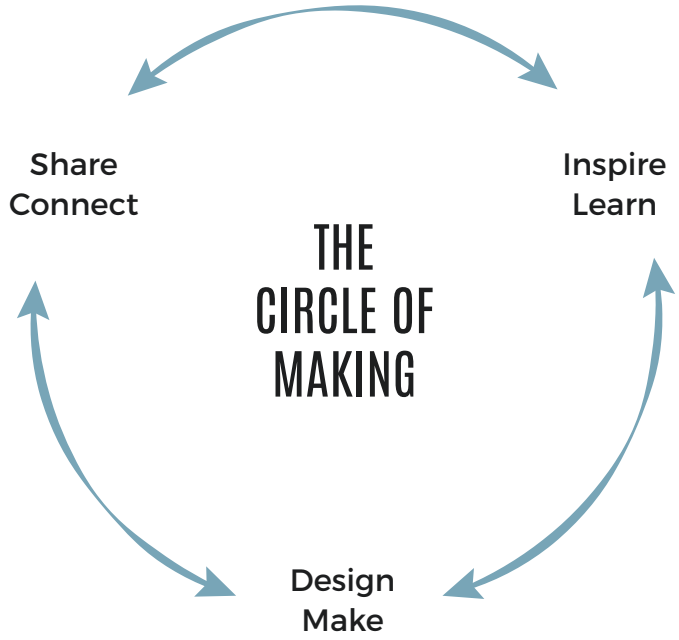
The design process itself starts with defining the project, studying different jointing methods and sketching. After this I show how I prototyped the chair, first with 1:5 scale models and later with 1:1 models. Making the final prototype is filmed and edited to a video, which is then shared on multiple social sharing platforms, such as YouTube, Instagram and Facebook. I will study how the finished chair and video of it is performing in these social media channels. Through this project I'm transforming something I design and make through virtual networks into something real and usable around the world: makeable design.

THE CIRCLE OF MAKING

Designing something often starts with a material to be explored, a shape to study or a function to fulfill. Today inspiration for all of these things can be found everywhere thanks to social media and ever-growing communities online. That inspiration then translates into making a real object. What that object becomes is often shared again on social platforms for others to get inspiration from. This "circle of making" continues, turning inspiration into making which then turns into sharing and connecting, which again turns into inspiration.

Peter Korn defines three contexts in which a person can participate in a creative field. Firstly you can participate by exploring new ideas by making things yourself. Secondly you can interact with the ideas of others directly through the object they have created. And thirdly you can engage with someone's creation remotely, through language and images in books, magazines, television or the Internet (Korn 2015, p. 147).

David Gauntlett makes a very similar discovery in his book, where he states that making is connecting in three different ways. Making is connecting because you have to connect materials, ideas, or both, together to make something new, making is connecting because creativity involves connecting with other people, and making is connecting because through making things and sharing them in the world, we engage and connect with our social and physical environments (Gauntlett 2011, p. 2).



This thesis studies making through all of those contexts. First I will look at the works of other makers through books, articles, websites and videos. Then I will start my own creative making process that involves sketching, prototyping and making the final artifact. Finally I will share my process with the world through pictures, video material and plans. This way I'm completing the project right where I originally started it, completing the circle. To me this continuous "circle of making" starts with inspiration and learning, continues with designing and making and ends with sharing and connecting, which again leads to inspiration and learning. I believe that this circle defines 21st century making.

ART, CRAFT AND DIY - THESIS TERMINOLOGY

Before looking at the history and the social meaning of today's DIY culture, I want to first introduce some of the terminology used in this thesis.

DIY is an abbreviation of the words "do it yourself". To DIY means to build, modify or repair something without the help of experts or professionals. The Oxford English Dictionary defines it as "The carrying out of a task oneself as opposed to relying on or employing other people or resources" (OED Online 2017).

DIY culture is a phenomenon built around DIY. It is constantly growing, especially in resent years and new areas that are specializing in certain type of DIY are surfacing. To name a few there's hacking, open source movement, DIY activism, maker culture etc. They all have their own areas of interest and some of them also have their own manifesto, declaring that DIY culture doesn't have to be just about making things; it can be about taking a political or social stance in the society. I'll look more into the political aspect of DIY culture in the next chapters.

To really understand the term DIY, it's important to analyze how it relates to art and craft. Oxford English Dictionary defines art as "The expression or application of creative skill and imagination, typically in a visual form such as painting, drawing, or sculpture, producing works to be appreciated primarily for their beauty or emotional power" (OED Online 2017). It also defines craft as "An art, trade, or profession requiring special skill and knowledge; esp. a manual art, a handi-

craft n. and adj.; sometimes applied to any business, calling, or profession by which a livelihood is earned" (OED Online 2017).

Dictionary definitions of art and craft sound quite similar. Art emphasizes imagination and beauty, whereas craft is seen as a more practical skill and knowledge. Howard Risatti studies the difference between art and craft in his book A Theory of Craft. He comes to a conclusion that craft and craft objects are about practical physical function that connects the relationship between material, technique and form. Art, on the other hand, doesn't have a connection to functionality (Risatti 2007, p. 19-20).

How does craft relate to DIY? Andrew Wagner questions the differentiation of craft and DIY in his essay: "The term "do it yourself" (or "DIY") as a point of differentiation within the world of craft has always struck me as odd. Aren't the words "craft" and "DIY" interchangeable? Aren't all makers, to some extent, doing it themselves?" (Levine & Heimerl 2008, p. 1). To me there is a clear difference between the words craft and DIY. In my opinion DIY is a more personal and casual aspect of craft. Self-sufficiency is in the core of DIY projects and they are usually unique projects done out of personal interest for a personal need. DIY projects are not about making something perfectly flawless. It's about expressing creativity and learning new things. I feel that if craft is about making with great skill, then DIY is about making with great enthusiasm, whether having skill or not.

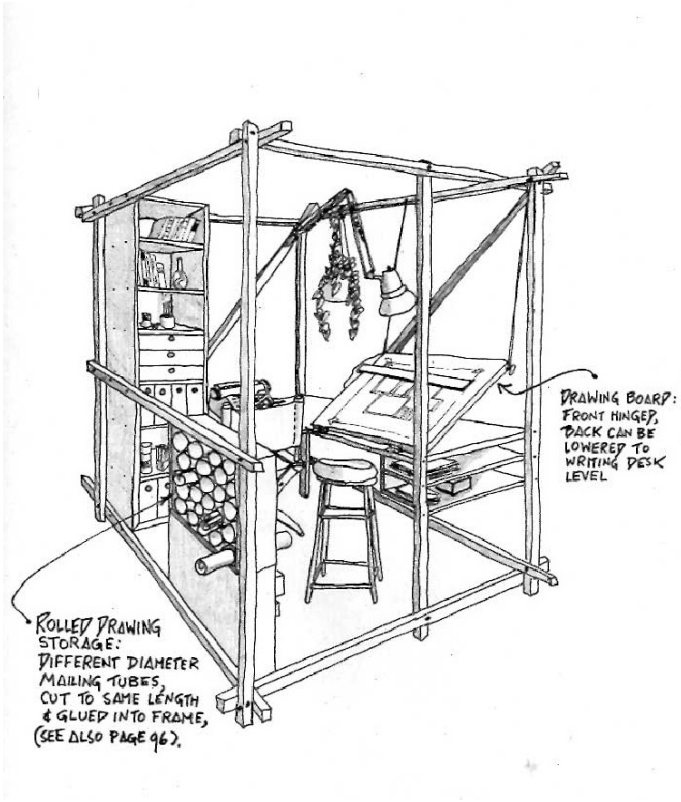
Making something with great enthusiasm also resonates from the word "maker". According to Oxford English Dictionary a maker is "A person who fashions, constructs, prepares for use, or manufactures something; a manufacturer" (OED Online 2017). The term maker stands for a person who does creative projects, often technology related such as CNC machining, 3D printing and laser cutting, but also more traditional woodworking or crafts. Just like with the word DIY the word maker doesn't in my opinion revolve around how well something is made, on the contrary, it depicts someone who is making something out of personal interest and enthusiasm. I will look how large of an impact making can have on a person's life in the upcoming chapters, but before that I'll look more closely at how DIY culture came into existence in the past.

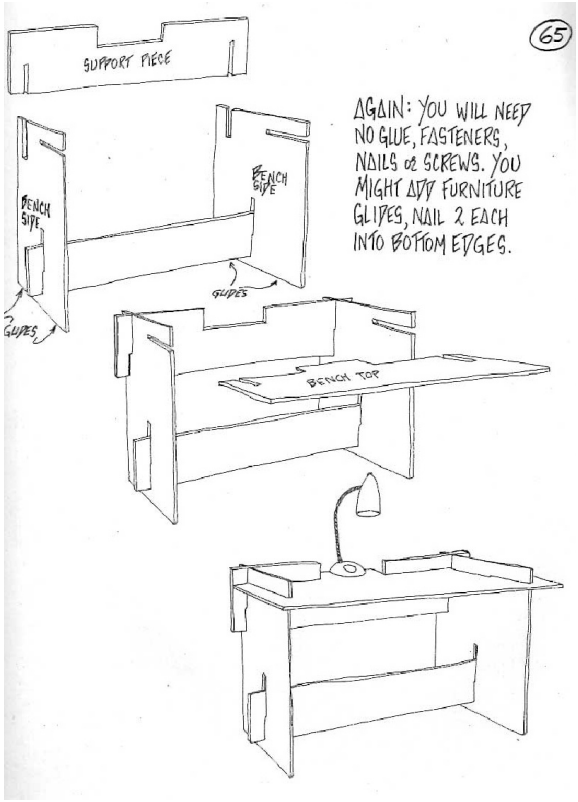
THE HISTORY OF DIY CULTURE

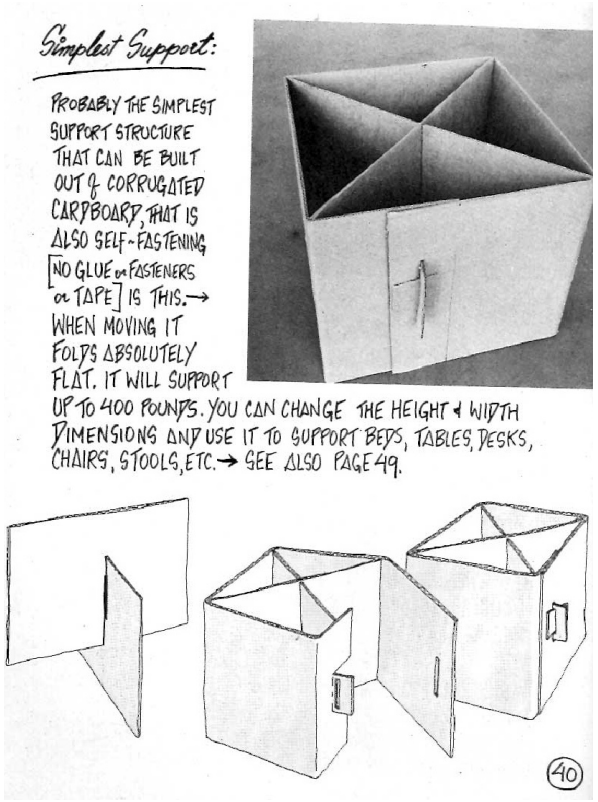
Starting point for the DIY culture we know today was in the anti-industrial Arts and Crafts movement at the turn of the 20th century, especially in North America.

Industrialization at the late 1800's started a revolution that turned the world of making and craft upside down. Making and building had always been a part of living throughout the history of man because survival often relied on the ability to repair and repurpose tools and materials (Kuznetsov & Paulos 2010, p. 1). This everyday practice of making and building was originally changed when machines took over tasks previously done by man. Before the Industrial Revolution virtually every object had been hand-made. Subsequent to it, making things by hand became something one did in opposition to prevailing societal norms (Korn 2015, p. 96). After the industrialization, a political Arts and Crafts movement started to evolve where making became a way to differentiate oneself from the society where anything could be industrially made.

Arts and Crafts movement started from the ideals of Victorian thinkers John Ruskin and William Morris. The central ideology was that all creative work was of equal status and a way of connecting people with nature, their own self and other people. Ruskin and Morris were both against turning people into mechanical tools of the industry, without a possibility for individual creativity (Gauntlett 2011, p. 30). These ideals connected well with the American ideals of self-reliance, individualism, community and romantic connection with nature, forming the Arts and Crafts movement (Gauntlett 2011, p. 47).



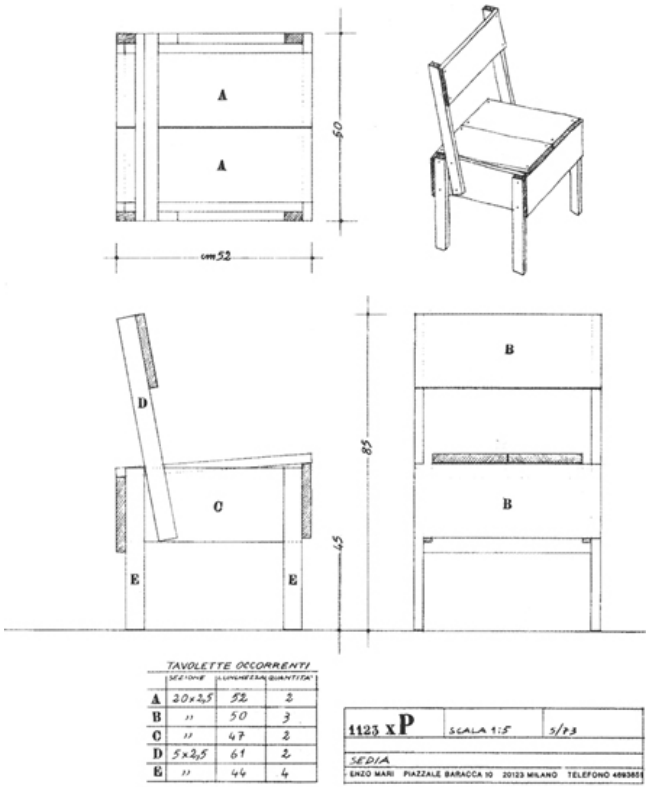




In the beginning the ideals of the movement were strongly rooted in the ideals of Ruskin and Morris. Industrial methods were rejected because they killed the creative spirit of an individual worker. But later the Arts and Crafts Movement led to artists and craftsmen making beautiful handmade products that the typical worker could not afford. This paradox was simply dissolved in the simple phrase: “do it yourself” (Gauntlett 2011, p. 48).

According to Oxford English Dictionary the word “do it yourself” has been used from around the year 1910. The meaning of DIY has, however, evolved and expanded its coverage over the years, ranging from home-improvement projects and handcrafts to indie music, electronic DIY kits and anything in between.

DIY had a huge surge in popularity in the 60’s and 70’s. Victor Papanek and James Hennessey were one of the first designers in the 70’s to publish a catalog of DIY furniture in a book called “Nomadic Furniture” in 1973. It presented detailed diagrams of furniture that was foldable, inflatable, stackable or disposable. The furniture pieces were mostly made of cardboard or wood and needed minimal to no fasteners to assemble. The book even gave suggestions how to rec-

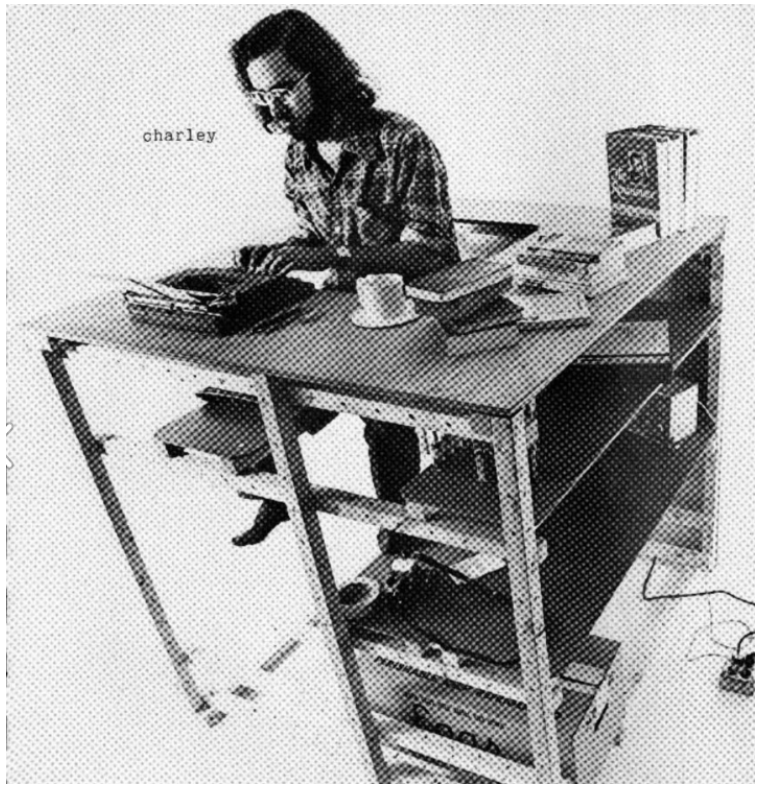


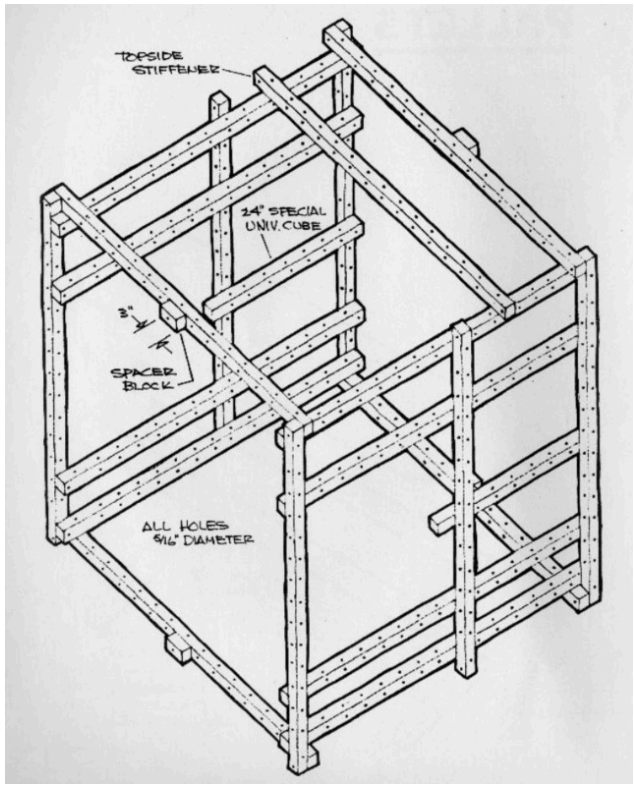
Left page
Left: Nomadic Furniture, Work Cube
Center: Nomadic Furniture, Work bench and desk
Right: Nomadic Furniture, Cardboard structure

This page
Left: Enzo Mari, Sedia chair drawings
Right: Enzo Mari, Sedia Chair, pine, made by Cucula

reate knock-offs of well-known and expensive design pieces with more affordable materials. They published a second book “Nomadic Furniture 2” in 1974.

Shortly after Papanek and Hennessey, an Italian designer Enzo Mari introduced a DIY furniture line called Autoprogettazione. All the furniture was made from simple construction lumber and only required a saw, a hammer and nails to put together. According to Mari, design is only design if it also communicates knowledge. If someone actually tried to build something, they would learn about design and construction of furniture (Artek production 2010). Like Papanek and Hennessey, Mari wanted to make it simple for anyone to make furniture. He knew that complicated production technologies or specialized set of tools would make the design difficult to understand. So he designed 19 different home furniture pieces that were made from simple nailed wooden boards. The name of the collection, Autoprogettazione, means self-design. The furniture plans with building instructions were sent to anyone who was willing to pay the stamps (Artek production 2010).





Left: Ken Isaacs, Multifunctional space module
Right: Ken Isaacs, Cube module structure

Around the time of Nomadic Furniture and Autoprogettazione, similar books started to emerge. Ken Isaacs published a book called "How To Build Your Own Living Structures", which presented furniture pieces and big outdoor structures made from simple cubic frames that could be stacked together. The frames were mostly made of wooden boards and plywood. The designs were multifunctional and combined working, sleeping, lounging and storage in the same design. Later in 1977 Peter S. Stamberg published a book called "Instant Furniture", which presented a collection of makeable design furniture pieces from different designers, for example Gerrit T. Rietweld, Kazuhide Takahama, Carlo Scarpa, Enzo Mari and Stamberg himself.

Similar DIY furniture concepts have been published ever since. The emergenge of World Wide Web at the end of 1900's caused interest in DIY to really start growing again. The possibility to share things all over the world drastically changed the way DIY culture spread. DIY became even more accessible than ever. More on that in the next chapter.

DIY CULTURE TODAY

The ideology of DIY has been around for about 100 years. But sharing design ideas around the world is definitely easier now than it was before. Since the start of the present century, enthusiasm and respect for homemade things have risen again. David Gauntlett believes that this is due to two reasons. First is a growing awareness of environmental issues: manufacturing new stuff endlessly has a troubling effect on our environment. Second is the wide use of Web and it's endless opportunities for sharing content and connecting makers around the world (Gauntlett 2011, p. 61).

This is also stated in a study about the rise of DIY culture: it has been widely adopted through new online sharing mechanisms over the past few decades (Kuznetsov & Paulos 2010, p. 1). According to the study people mostly work on DIY projects to express creativity and learn new skills. Online communities offer a place to get feedback, advice and inspiration from people interested in the same topics (Kuznetsov & Paulos 2010, p. 6-7). This makes it possible for makers to find like-minded people from around the world.

I have also noticed this by reading and following different DIY, fashion and design centered blogs and online communities over the last couple years. Sharing and finding inspiration online today is easy and convenient. If one wants to learn to make something, directions and support can be found quickly just a few clicks away.

But even online sharing has changed in recent years. DIY is still a loosely used term, ranging from modification of existing pieces to building from scratch. But the wide range of different DIY projects are shared in not just personal blogs, but also different social medias, such as YouTube, Instagram and Pinterest.

These platforms have gained popularity over personal blogs because they offer people the possibility to have their own content as a part of a bigger community. People can share their projects and have a bigger chance of people finding them than posting their projects to a personal blog site. This also means that it's easier for people to find inspiration and ideas from a large group of people on one single platform without having to jump around different websites or blogs. Because these social media platforms are made for connecting with others, it also makes communicating with other makers easy and convenient.

In addition to the emergence of different online sharing mechanisms, technology is playing a bigger part in DIY culture than it did before. New technology in the form of 3D printers, laser cutters and CNC milling machines has strongly entered the world of DIY. What only a couple years ago were extremely expensive gadgets are now more accessible for regular people. The sizes are smaller and the technology has become more affordable in a way that it's possible to buy and use these technologies at home. They are the equivalent of home printers today.

However, there has been critique over the use of these machines, since a machine, not a person, does the actual making process. Allison Arieff questions the highlighted use of these technologies, because she thinks they actually support consumerism. Products are designed for the sake of utilizing a new technology and that can lead to designing and making solutions for problems that actually don't exist (Arieff 2014).

I think the problem comes from being blinded by a new exciting technology. Rather than using the technology to make something, the technology itself becomes the sole purpose of making an object. This thinking easily leads to useless objects. But using 3D printing, laser cutting or CNC milling technologies as a tool to make something makes them no different than, for example, using a table saw or a lathe. On the contrary, it can open more possibilities for cre-

ativity and making things, which is exactly what DIY culture today is about.

With the rise of new technologies there has also been a return to more traditional crafts. Traditional woodworking, pottery and other crafts have started to appear again in the world of DIY. Designer Jonathan Anderson says that hand-crafted items are experiencing a huge surge in popularity as a backlash to the dominance of digital devices and non-reality (Morby 2018). People are craving for more tactile and personal handmade things again. This interest in handmade things causes DIY culture to continue to grow in popularity.

Top left: Benjamin Uyeda, Bucket stool
Top center: Ana White, Adjustable height bolt bar stool
Top right: Opendesk, Lift standing desk
Bottom: Floyd, shelf

DIY AS A BUSINESS

Most designers think that the only way to design, manufacture and distribute furniture to masses is an expensive chain of prototyping, patenting, manufacturing, shipping, marketing and retailing. But with online sharing, there's an alternative for complicated and expensive manufacturing methods: using social media as a way of sharing ideas for free (TEDx Talks 2015).

Sharing design ideas around the world is definitely easier now than it was 40 years ago. Like mentioned earlier, different online sharing mechanisms have grown vastly during the last decades. Sharing is more global than ever before. And not only that, but content creation has become a new type of media and a way to do business. By sharing designs online anyone can market themself and build a personal brand (Anderson 2012, p. 112).

In the last couple of years social media has become a new platform for makers to share their work for bigger audiences and to build active maker communities around the world. There are many designers who have fully embraced designing, making and sharing content as a new career opportunity. Before DIY was mostly a personal hobby, but now sharing DIY projects online can even earn a living.

I find it interesting how so many makers and designers have been able to, thanks to the rise of social media, turn sharing DIY projects into a business. This wasn't really possible a couple decades ago. One of these makers is Benjamin Uyeda. Uyeda is an American designer and an architect who makes videos on YouTube under a channel name Home Made Modern. He features different DIY projects, ranging from small home décor projects to big furniture building

projects. All these projects usually have one thing in common: they are made of affordable materials and with limited tools.

One of Uyeda's most known pieces is a bucket stool. It's made from five dollars worth of materials: concrete and wooden dowels. The idea is simple: cut the dowels to length, mix concrete in a round bucket, place the wooden dowels in the wet concrete and let the concrete cure. Once the concrete is dry, the finished stool can be removed from its mold. Uyeda has many experimental furniture pieces that don't require a lot of accuracy to make.

Ana White is another maker and designer who provides detailed plans for DIY furniture. She has built her own website over the last eight years and has over 1000 free furniture plans available. The furniture is usually made from simple dimensional boards and with limited tools, such as a miter saw, a drill and a brad nailer. Unlike Uyeda, she designs furniture that is more rustic and traditional in style. Her designs have been hugely popular because of the detailed drawings and clear instructions.

While Uyeda and White both share free plans for DIY furniture, some makers and designers also sell DIY furniture plans for a living. Many makers share simple plans for free but also sell the plans that are more detailed and take longer to design. One of these makers is Bob Claggett who is a full-time youtuber and maker with close to 2 million subscribers on his channel I like to make stuff. He sells plans for DIY projects on his website with prices between 2-20 dollars for a set of plans. He is not the only one: there are many other makers like him selling DIY furniture plans. That proves that sharing DIY furniture as a business can be done in different ways, through sponsors and monetization but also through selling the actual furniture plans.

Even some companies are embracing DIY culture and selling products that promote making in some way. Opendesk offers a collection of CNC machined furniture that can be cut anywhere around the world. A customer can request quotes from local makers to make their products. This means that the materials and the place that manufactures the furniture are as local as possible and need for shipping is minimal. Another company called Floyd sells metal leg hardware that can be attached to any piece of flat material to create a table, a shelf, a bed etc. The hardware can be packed and shipped in a small space and the user can affect how the finished piece will look by choosing the material to attach the hardware to. These are just a couple of examples how companies are embracing the DIY mentality and using the popularity of DIY as a way to do business.

PSYCHOLOGY OF MAKING

So far I have mostly looked at how DIY culture has become popular again, but to fully understand the phenomenon it's important to understand why it has become popular. One of the biggest reasons in my opinion is how making things makes us feel. William Morris argued this already over a hundred years ago: "[.] a man at work, making something that he feels will exist because he is working at it and wills it, is exercising the energies of his mind and soul as well as his body." (Morris, p.288).

There's something very satisfying about a DIY project starting right from the initial idea to long after the project has been finished. It's about having a goal, working towards it and, in the end, reaching it that feels very satisfactory. Morris also continues that: "If we work thus we shall be men, and our days will be happy and eventful." (Morris, p.288).

It is also stated in a number of studies that goal-oriented activities are a major contributor to happiness (Lyubomirsky & Sheldon & Schkade 2005). Even money or leisure time, albeit seen valuable, can't make people happy if they are initially bored (Gauntlett 2011, p. 125-126).

So in order to feel happiness and fulfillment people need projects that give them challenges and goals. Even projects that are difficult and challenging can bring happiness and satisfaction. Peter Korn describes his difficult experience in making a dining table out of solid oak. Turning the legs on a lathe was very challenging and he had to make seven legs to even get four

good ones to use. He describes that during the making process he wasn't radiant with happiness but for him it was, absolutely, the stuff of meaning and fulfillment. He explains that he discovered within himself the capacity to transform a thought into a beautiful object and he believes that is precisely what makes creative practice such a generous source of fulfillment (Korn 2015, p. 121-125). Noticing that you can make something with your own hands can be very rewarding.

However, the need to make anything ourselves is almost non-existent in the modern world. In our society almost everything is mass-produced and sold in big quantities. Almost anything can be bought. I think we are so used to being offered ready-made options that making everyday objects ourselves doesn't usually even cross our minds as an alternative.

Gauntlett explains it very well. He says that we are so used to people telling us that the only way to do things is to pay experts, professionals and businesses to do things for us, because we can't really manage it ourselves. He continues to state that according to DIY culture that's rubbish; we can do things ourselves and more importantly, it feels good to do it ourselves. DIY is really good for self-esteem whereas getting it done for you is disempowering, frustrating and less meaningful (Gauntlett 2011, p. 56). Callie Janoff also states the same thing in her essay: "Consumption eats self-esteem; creation makes it grow. I've written and said this so many times, but I believe it strongly: making things makes us happier, more whole people." (Levine & Heimerl 2008, p. 57).

By designing makeable furniture I want to inspire people to make more and to help them find the same joy and fulfillment that I have found with making things myself. Besides that, I think sharing makeable design can be very beneficial for designers. Benjamin Uyeda says that sharing makeable furniture allows him to focus on new ideas. Traditional manufacturing and marketing techniques take a lot of time, even years. It doesn't encourage inspiration, innovation or experimentation. But sharing designs through social networks makes it possible to turn an idea into an actual piece and share it to thousands of people in a matter of days. This makes it possible to concentrate on new fresh design ideas instead of being tied to old ones (TEDx Talks 2015).

In addition, making things can also make the object that was made more valuable to the maker. In a research report by Norton, Mochon and Ariely, the researchers found out that manual labor increases the valuation of an object. If a person takes part in the assembling or building of a product, they value it higher than the same product that is pre-assembled. The researchers call this phenomenon the "IKEA effect" (Norton, Michael I. & Mochon, Daniel & Ariely, Dan 2011).

This increase in valuation is personal to the maker because they are the one making the piece and using it. So there is clearly something about manual labor that, when successfully completed, gives people a great amount of satisfaction. This satisfaction is then translated to the value of the object that was made.

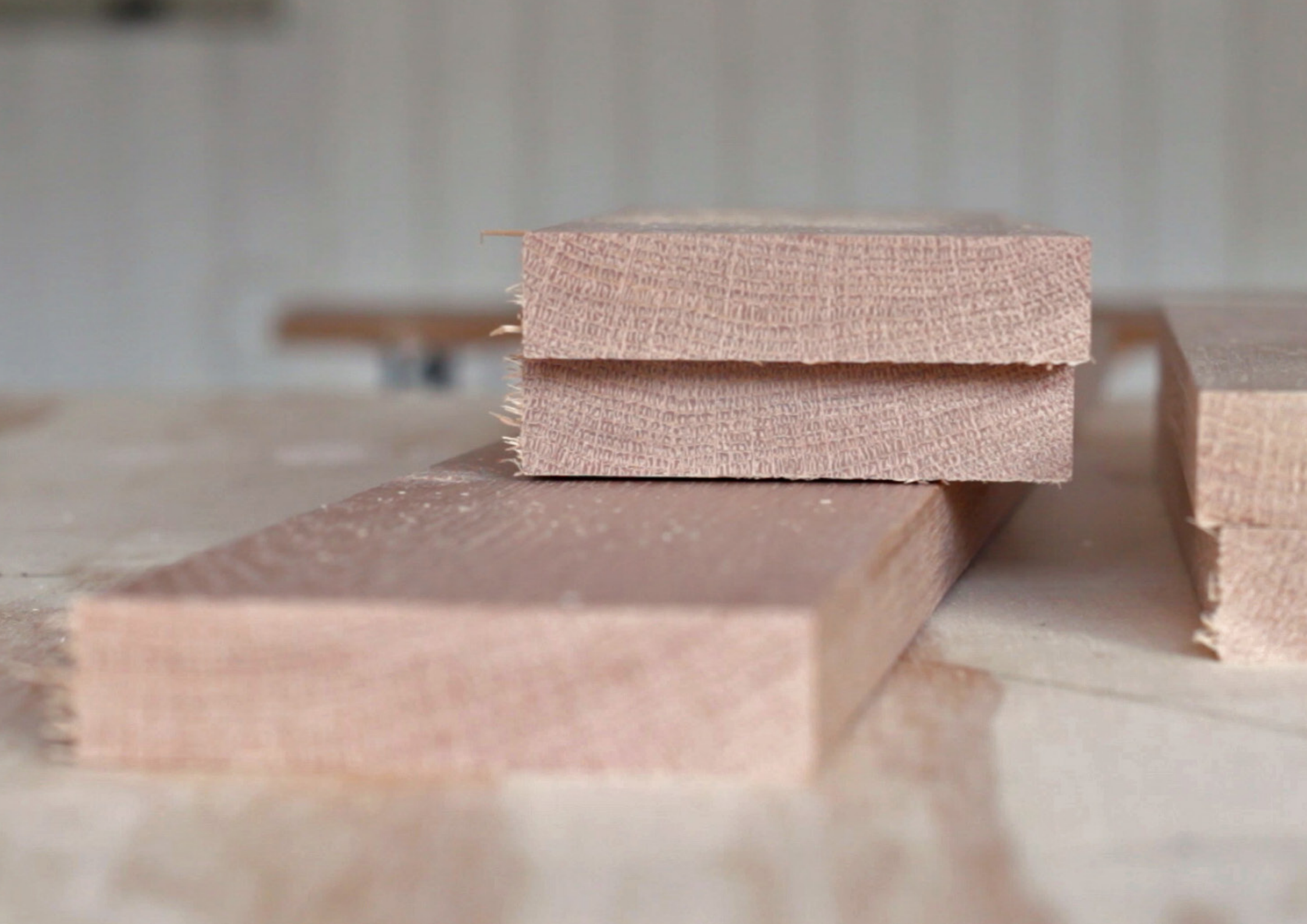
Buck Clifford Rosenberg also states that self-assembly furniture offers a sense of physical home construction. By participating in the assembly process, the user of the product has a sense of building their own living environment (Rosenberg 2005). The object then becomes more personal because there has been a physical connection to it while assembling it. The same principle applies to DIY projects.

If I had to give most of my belongings away, I would most likely give away the pieces I bought and keep the ones I designed and made myself. If I had to sell the items I've made, I would probably put a higher price on them because of my personal emotional attachment to the objects. They have much more value to me because I've seen the object take shape and know how much work was involved making it.

In his book, Peter Korn describes his feelings towards a coffee table he had made for his living room. He explains that seeing the table in the mornings on his way to his study made him smile on the inside, partly because of its visual aesthetics and partly because there was a "glow of satisfaction at having brought so pleasing an object into being" (Korn 2015, p. 61-62). This of course links to the idea that making brings joy, but also that the object itself continues to bring satisfaction and pride long after the making itself is done.

Richard Sennet argues the same thing: "Pride in one's work lies at the heart of craftsmanship as the reward for skill and commitment." (Sennet 2008, p. 294). Both of these men seem to refer to dedicated craftsmanship that is perfectly executed but I think the same principle can definitely apply for smaller projects as well. The object doesn't have to be intensely laborious or difficult to make in order to be valuable in the eyes or the maker.

Peter Korn, Fluted Coffee Table



PROJECT DOCUMENTATION - DEFINING THE PROJECT

After researching the background of today's DIY culture and different motivations for making things, it's time to start my own makeable design project. My methodology for this thesis is documentation and reflection through design process. To define the framing for the project better, I decided to specify a framework to guide my design process. This framework doubles as a checklist for the design process as well as help to justify the design decisions of the final piece.

The idea is to design a makeable general-purpose chair. I chose to design a chair because of its complexity and challenging construction. Ideally the finished chair can be made with only a few simple tools and materials available in hardware stores or home centers. This makes wood the most logic choice as the material of the chair. Wood is commonly used in furniture because it's globally available, structurally strong and relatively easy to work with. However, rough sawn wood slabs that need to be cut and planed before they can be used are not a possibility because they are not easy to acquire or work with. The material for the chair needs to be dimensioned and ready to use.

The making process should limit the amount of expensive tools needed to make this chair. Big expensive woodworking tools are not accessible or affordable enough to purchase for everybody. The finished a piece of furniture should only need a few simple and relatively affordable tools to build. I also need to consider the fact that building a chair is not usually a begin-

ner level project and that if someone wants to make the chair I design, they probably already have some basic tools available to them. So I will consider the use of simple power tools that are also common in construction and renovation projects, not limited to fine woodworking.

The techniques should be straightforward and shouldn't require machine-like accuracy. The way the chair is constructed makes a big difference in the durability and makeability. Studying different jointing methods to determine the best techniques to use in my project will be crucial for the design process.

Forming a clear idea of the excisting DIY chairs helps to determine how to position the finalized chair design in the market. I'm bechmarking currently available DIY chair designs in the next chapter to analyze what is missing from the available DIY chair plans. Knowing the available designs also help to justify future design choices.

Part of this thesis is sharing the finalized DIY chair through different social networks. Sharing this project includes filming a video about the making process and sharing the plans and instructions online. I'm interested to test how people will receive my makeable chair project. While I don't think that everybody who sees this project online ends up actually making the chair, it doesn't mean that the video itself won't inspire and entertain a large group of people. I will analyze the results of this experimentation at the end of this thesis.

BENCHMARKING DIY CHAIRS

I researched around the Internet to get a clearer idea about the DIY chairs already available on the Internet at this moment. I tried to look for designs that were relatively easy to make and had a pleasing aesthetic. I was looking for designs for DIY general-purpose chairs because that was what I was designing. All of these chairs come with free plans and instructions for making.

Looking at different DIY projects online, I noticed that affordable dimensional boards, such as 2x4's, and plywood are the most often used material for DIY projects. One of the designs I found that used mostly dimensional lumber was Ana White's Harriet chair. It's made from 2x2's and 1x3's and the construction is made with pocket hole screws. The design is quite simple, there's no curves to cut and the construction seems sturdy. The pocket hole jig used in White's design is an affordable tool, but the downside is that a specialized tool might not be available everywhere.

Max Lamb's 051 DIY chair uses regular screws with his chair design. This means that the screw heads are visible in the design. Lamb's chair is made with 1x2's and all the 31 parts of the chair are actually the same length: 47cm. This makes the construction very easy and quick to make even for a beginner. I'm amazed at how easy Lamb was able to make the building process, but I think that using the same length of wood for all the parts makes the chair feel a bit like a full sized matchstick chair.

Left page
Top left: Alejandro Palandjoglou, P9C – chair
Top center: Stephen Cartwright, sleek simple chair
Top right: Max Lamb, 051 DIY chair
Bottom left: Ana White, Harriet chair
Bottom right: Tord Boontje, Rough and ready chair

This page
Left: Benjamin Uyeda, ZipStich chair
Right: James Tooze, Open chair

Tord Boontje's Rough and ready chair has the same effect. It is made by screwing 1x1's together to form the shape. Plywood or OSB is used for the chair seat and backrest and part of the design is strapping a blanket around the seat and the backrest for comfort. Like its name suggest, Rough and ready chair can be made with salvaged material and has a sense of incompleteness on purpose. I'm not sure if the construction can withstand a lot of use, because the material is so thin and there's not many screws holding the chair together. This chair might not even be meant to last a long time and looks to be more suited as a temporary chair for a temporary use.

Boontje's Rought and ready chair is one of the few designs that has multiple different materials in the construction. Other designs seem to rely on one key material. Alejandro Palandjoglou's P9C – chair uses CNC- milled pre-finished plywood to form the parts. The shape is inspired by Eames' LCW bent plywood chair. Palandjoglou offers a free cutting template to use with a CNC router. While CNC routers have become less expensive in the last few years, they are still more expensive than basic woodworking tools and therefore not available to everybody. This makes any CNC-cut furniture more difficult for people to make.

James Tooze's Open chair uses mostly plywood, but also some 30x30mm pine boards to make the construction stronger. The chair is made

from plywood offcuts that would otherwise be thrown away as waste. The construction is clever. The parts enforcing the joints are cut to shape after they are screwed to the other parts, ensuring perfect fit. The chair is quite easy to make, but is does require making a jig for screwing the pieces together.

Benjamin Uyeda has taken a different approach to plywood furniture with his experimental Zip-Stich chair. It's made with plywood and zip ties. The zip ties are used to "stitch" the chair together. The design is very innovative, producing a very interesting looking chair. But my biggest concern with his design is that the zip ties will start breaking after a while making the chair fall apart.

On the opposite end of the durability spectrum is Stephen Cartwright's Sleek simple chair. The chair is made with 1x6's and the leg parts are laminated to get thicker stock. This chair is more advanced and complicated to make than the other chairs I've introduced so far. It requires the tools and techniques of more traditional woodworking. The joints are mortise and tenon joints and the backrest is laminated in a bending form to make a curved shape. Cartwright's chair takes the most amount of work but at the same time produces a finished piece with the cleanest aesthetic. The construction is also probably strongest of all the chairs I've featured so far. However, with so many steps in the making process, it's definitely not a beginner friendly project. Also the advanced woodworking tools needed to make this chair are expensive and not available to everyone.

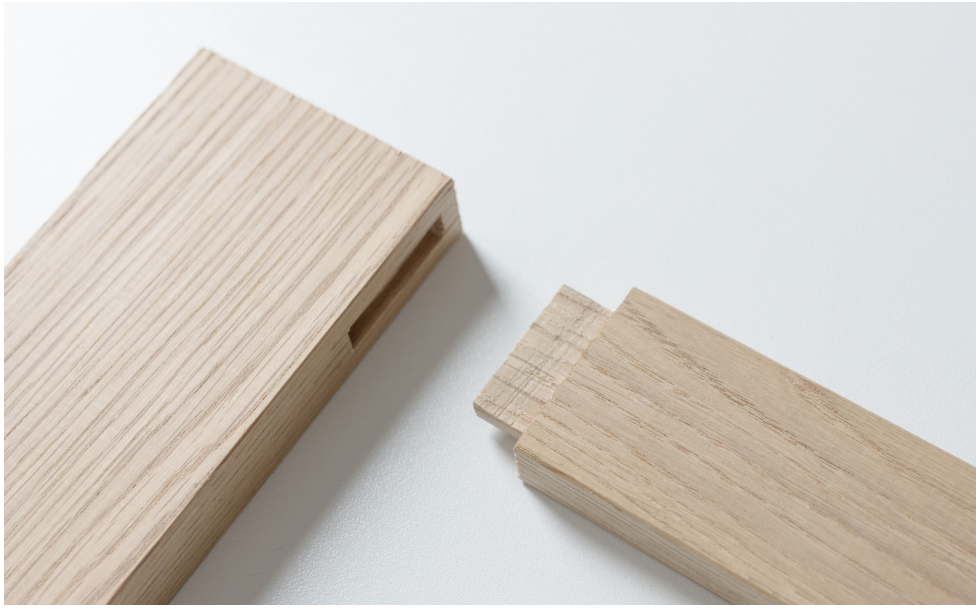
I can detect a clear pattern with the available DIY chair designs. In my opinion the DIY chairs that are easiest to make are also the ones that compromise on appearance and sometimes even durability the most. On the other hand, the ones that are most difficult to make are more aesthetically pleasing. As a designer, I think it's important to design furniture pieces that fit most home environments. The rougher the aesthetic of the chair, the fewer people it will please and therefore fewer will make it. Same thing applies for designs that are too complicated to make. I'm hoping to find some middle ground with my DIY chair. I want to design something that isn't compromising too much on makeability or aesthetics. In my opinion a chair that is easy to make but also beautiful piece of design doesn't yet exist in the available DIY chair designs.

STUDYING DIFFERENT JOINTING METHODS

I felt it was crucial to research different jointing methods for wood before the actual design process. Strong and durable wood joints are essential for a piece of furniture, especially a chair. The joints need to be strong enough to keep the structure intact and carry the weight of a user. There are hundreds of different kinds of jointing methods for different structures that date back hundreds of years.

Knowing more about different joints I could use before designing the actual piece of furniture is essential. The most important factor in choosing the right jointing method for this project is durability and makeability of the joint. In this chapter I will briefly examine a couple simple jointing methods and assess their suitability for this project.

Very popular way to join wood pieces together in a DIY project is to use screws. There are two ways to join parts together with screws: end grain screws and pocket hole screws. Pocket hole screws have become very popular in DIY furniture during the last few years, since the joint is a bit stronger with them than it is with end grain screws. Pocket hole screws require a specific jig tool for drilling the holes and the actual pocket holes are visible on the other side of the joint, which is not always desirable with furniture making. I think that using screws might be better, for example, kitchen cabinet building than furniture. Screws are not as durable option as wood joints because screws can loosen over time or if force is applied to the joint.



Mortise and tenon joint is traditionally often used in furniture making because it is a very strong way to join two pieces of wood together. It consists of a mortise hole and a tenon tongue that fit together tightly forming the joint. However, it needs to be very accurately cut with a chisel to be durable. Mortise and tenon might be too difficult to make for a beginner because it requires high accuracy and skillful use of traditional hand tools, for example the use of a sharp chisel to bore out the mortise and a hand saw to cut the shoulders and cheeks of the tenon.

Lap joint is a simple but a very strong joint. It consists of two overlapping boards. Lap joint can be made in different ways, traditionally with the use of a hand saw and a sharp chisel for finishing surfaces, but it can also be made with a table saw quite easily. This joint is more traditionally used for cabinetmaking so I'm not entirely sure if it will be useful for a chair design.

Dowel joint can be almost as strong as mortise and tenon joint. Hidden dowel joints, were the dowels are hidden inside the joint, require accuracy because the holes for the dowels need to be perfectly aligned on each side. Using a domino machine simplifies the making of a dowel joint but domino machines are expensive and for that reason, not very commonly used. However, through dowel joints could work for this project. They are easier to make and don't require as much accuracy as a hidden dowel joint, because the holes don't have to be perfectly perpendicular to the outside surface. The difference with hidden and through dowel joint is that with a hidden dowel joint, the dowels can't be seen, but through dowel joint leaves the

ends of the dowels visible on the outside. This can be a nice way of showing the craftsmanship that goes into making the joint, as well as giving the piece some details.

To make the furniture piece makeable for most people, the jointing methods must be simple and straightforward but also strong. Screws are easy to use but they may not be strong enough for furniture making. Therefore I won't be using them in the finished design. Mortise and tenon joint would be ideal when it comes to strength of the joint, but it is probably a bit too difficult to make. Lap joint is a bit easier to make than mortise and tenon, so that might be an option if there is a need for it in the design. Hidden dowel joint is quite difficult to make, but through dowel joint is easier, because the holes for the dowels can be drilled using a cordless drill while the joint is clamped and possibly even clued in place. For this reason I think that through dowel joints seem to be the best fit for my project.

Left page
Left: Mortise and tenon joint, open
Right: Mortise and tenon joint, closed

This page
Left: Lap joint, open
Right: Through dowel joint

Left: First sketches
Right: First 1:5 model with a felt backrest

FIRST MOCK-UPS

I started with finding inspiration and references followed by documenting my ideas on paper. I tried to keep the makeability as a framework for the design at all times. After sketching different designs I found myself drawn to one of them, so I kept developing that more. The idea was that there would be a simple chair frame and the backrest would be made out of leather or felt. I liked the idea of combining two different materials in the chair. The felt or leather would also make a nice natural curve in the piece that otherwise had a lot of straight lines.

I made a 1:5 scale model and a 3D model using Rhinoceros. The 3D model was very useful, because I was able to make small changes quickly and see how they would look. I was also able to get accurate measurements for the different parts needed to build the first full size mock-up.

I made the first mock-up at my parents' garage with very limited tools. I didn't want to use the schools wood workshop, because I wanted to know if my design really was makeable with limited tools.

During the making of the first full size mock-up I noticed that the measurements weren't quite working yet. The stiles were a bit uncomfortable for the arms: if a person would sit resting their hands on their lap, the ends of the stiles would slightly poke the underside of their arms. It wasn't extremely uncomfortable, but it wasn't ideal, so I decided to straighten the stiles a couple degrees and lengthen them so that they wouldn't touch the arms so much. I also noticed that while the size of the seat was sufficient, the frame didn't allow it to be positioned forward enough to seat comfortably. To fix this I needed to make the side rails longer. On a more positive

note, I noticed that this chair was relatively easy and fast to make and therefore I was able to make another mock-up with the new measurements in a matter of hours.

While making the mock-ups I experimented with sawing all the pieces to length by hand. It seemed to work quite well and was surprisingly easy. I used a Japanese saw to get a more precise and cleaner cut. I used a plastic miter box to ensure my cuts were straight. It somewhat worked, but not very well, and was especially difficult with the angled cuts. I needed a simpler, easier method for cutting the pieces if I were to use just a handsaw to cut the pieces to length.

My method for the glue-up was to apply glue to the joints and then clamp them together. I then let the joints dry and then drilled holes through the joints to fit the dowels in. I noticed that the force of the drill pulled the glued joint apart easily when the dowels weren't there to enforce the joint. So I did the drilling in a way that the joint was clamped together to enforce it through the drilling. It wasn't very difficult, but it felt more complicated than it should, so I decided to make the joints differently next time.

First 1:1 mock-ups with pine and felt

1. Stile
2. Backrest
3. Seat
4. Back rail
5. Side rail
6. Front rail
7. Back leg
8. Front leg

I also made the backrest from a piece of felt to test how it would work. It was simply sewn together using two seams and then pulled over the stiles. It worked quite well, but I was a bit concerned whether only one rail in the back of the chair would be enough to make the chair sturdy. The pine I used for the mock-up seemed to give in a bit under weight, not from the joints however, but because the material was so soft that the stiles bended. And because I was using felt as a backrest, there wasn't a top rail that would have given the chair a bit more strength. I was also a bit worried that the felt would make the chair more difficult to make, because it required sewing.

After my thesis advisor pointed out that my design bore close resemblance to a chair designed by Yrjö Wiherheimo called Vilter, I started to doubt even more if the felt was ever a good idea for this project in the first place. I had never seen Wiherheimo's chair before, but I had to agree that it looked very similar to mine from the front, because it also had a felt backrest. The side view of the chair was very different, but it didn't really matter, I knew I had to change my plans.

There were many things about my first mock-up that were bothering me anyway. It looked clumsy and a bit awkward, especially from the front and I felt I just couldn't get it to look right. It started to feel impossible to design something that would look beautiful and also be makeable at the same time. I felt like design and makeability were two opposites and I was trying to balance in between them, never really having any success in both at the same time. If I compromised in design, I would get a chair that was easy to make, but not very beautiful. If I compromised in makeability, I would get a chair that was beautiful, but difficult to make. I found this stage of the project the most difficult.

First mock-up of the chair with felt backrest. Problems with seat lenght and the backrest and stiles can be easily seen.

SECOND MOCK-UPS

It took some time to figure out an idea that would work and solve all the problems I had with the original design idea. I knew I had to compromise on some aspects of the design but it was difficult for me to see how I could do that without compromising the initial principles I had set for myself earlier.

At some point I even thought that maybe I should do something else entirely. I thought of changing the project from one chair to making a series of smaller projects. Then I could do something simpler and I wouldn't have to struggle with a chair design that felt impossible. But, as Peter Dormer states in his essay, that would be cheating. "It is frequently easier to change the subject than to solve the challenges to one's knowledge that are raised by the original theme." (Dormer 1997, p. 222) Staying true to your goals is what Dormer calls "honest work".

So I continued with the design process. I decided to focus on the things that seemed to work in the first mock-up and keep those elements. I liked the side profile with the tilted back legs. Also the construction of the frame seemed to work well for the purpose of this project. What I wanted to change were the front profile and the issue with the felt backrest.

First I had a thought that the chair would be easiest to make if there weren't any unnecessary angles in the chair. That's why in the first mock-ups almost all the cuts and joints were at 90 degrees. While being easier to make, it made the chair look clumsy. I tried tilting the legs inward two degrees and the chair started to look better instantly. I hoped that the visual benefits of this change would exceed the extra steps it would add to the instructions.

I also decided to not use felt for the backrest, but use wood instead. This change had multiple benefits. Firstly, the chair would have a back rail and a top rail as a backrest. Together they would make the chair sturdier and stronger. Secondly, the chair would be more affordable to make. Using thick felt or leather as a crucial component would be more expensive for a maker, since they are harder to find and quite expensive. However, a chair made completely out of wood would only need off-the-shelf materials from a hardware store. And thirdly, the chair would be easier to make, because there wouldn't be any need for a sewing machine that can sew thick felt or leather.

Couple other upgrades were needed in the design when I changed the felt backrest to a wooden one. I needed to make the stiles a different shape if I wanted to keep the back legs tilted forward like before. So I made a curve to them that would position the backrest in a better angle for sitting. The stiles could still be cut from a single piece of wood so that there would be minimal waste. Making them would be a bit more complicated than before, but still fairly easy.

I also made some small adjustments to the side rails. I changed the shape a bit and moved them further apart from each other. I also flipped the

Images from left to right
A sketch of the second mock-up
1:5 model
1:5 model, testing scale
1:1 model
1:1 model, testing ergonomics

front legs so that the wide side of the board would face forward. I thought it made the chair look a bit more balanced from the side and front views.

After making these changes on my 3D model, I made a 1:5 model to better see the proportions. I had first had the idea of making the seat with rounded corners. For some reason I liked the way it looked on sketches but after making the scale model, the rounded corners started looking out of place. I decided to make the seat rectangular with angled sides that taper to the back edge. This seemed to fit in with the look of the chair frame better than the original rounded seat. The rectangular seat would also be a lot easier to make with simple straight cuts.

I made a second full size mock-up that included these changes. I tried a couple of new techniques to make things easier and simpler. First change was to use a perfectly square thick block as a guide for sawing instead of a miter box. I noticed that it was a lot easier to just draw the line I needed to cut, clamp the block along the line and saw along the edge of the block, making sure with my left hand fingers that the saw slid along the side of the block. I was able to get perfectly straight cuts easily using this method.

Second change I made was to drill all the holes to the pieces before gluing. I first drilled holes through the front and back legs as well as the front and the back rail. Then I could clamp each joint together on the worktop without glue and use the drilled holes as a drilling guide to drill holes to the adjoining piece. I always made sure to mark each drilled joint, so that I could match the right pieces perfectly together. The square block I used for sawing was also very helpful with clamping the side rails to the front and back rails in a 90-degree angle. Drilling the holes before glue-up was very easy and made the glue-up a lot easier. All the joints lined up perfectly with the dowels and minimal clamping was needed.

One thing I decided to do differently in the final version was to add painter's tape to the pieces before drilling the holes. This hopefully prevents the wood from splintering around the holes and also helps with the glue cleanup, because the tape can be removed after gluing.

This second mock-up I made was a lot closer to what I had hoped in terms of makeability and design. There were still a couple of changes I wanted to make for the final version. I decided that the angled sides of the seat were too steep so I made them a couple degrees straighter. This made the seat look more proportionate to the frame, whereas before it looked too sharp. I also changed my mind and decided to turn the front legs back the way they were before, so that the narrow side of the leg was facing forward. I believe it will make the chair a bit stronger and look better in the end. It will also be easier to drill the holes for the dowels.

FINAL PROTOTYPE

After making all the changes to the 3D model I noticed that all the parts for the chair could be cut from two 1x4's. To be able to make the seat piece, this option requires the use of a good sharp hand plane, a table saw, or a jointer to get a good glue up for the seat. Dimensional boards like 1X4's are planed but they have a slight chamfer on the corners and if they are clued together without removing it, it leaves unwanted grooves on the panel. Planing the pieces or cutting some material from the edges removes the chamfer and the board can be glued together easily.

But because planing or using a table saw is not possible for everyone, there is also the possibility of using laminated wood panels for the seat part. Using a laminated wood panel eliminates the need for special tools that are required for achieving a good glue-up from the dimensional boards.

I made a list of the minimum set of tools needed to make this chair. Only four power tools are necessary, a cordless drill, a jigsaw, a miter saw and an orbital sander. The miter saw and orbital sander could be substituted for a handsaw and sanding by hand. But I figured that these four tools are one of the first power tools people usually buy when they start making DIY projects. They are relatively affordable and very versatile. Other necessary tools include more traditional woodworking hand tools such as a handsaw, a chisel, a file and optionally, a hand plane. These help with the finishing touches.

COMPLETE TOOL LIST:

Pencil

Ruler

Tape measure

Speed square or try square

Protractor for measuring and marking angled lines

Wooden or rubber mallet

Minimum two long clamps and two short clamps

Jigsaw (or a band saw)

Hand saw / Japanese saw

Cordless drill with a 10mm drill bit (the width of the wood dowel used)

Miter saw

Orbital sander & sandpaper

Chisel

Half-round file

Hand plane

Table saw (optional)

Painter's tape

Wood Glue

MATERIAL LIST FOR ONE CHAIR:

Two 1x4's (about 20x90mm, 3000mm long)

Wood dowels 10mm thick, 50-60mm long each

18-20mm thick laminated wood panel 400mmx400mm (If needed for the seat)

Metal or wood harware to attach the seat to the frame so that the wood can expand and contract

JIGS NEEDED FOR CUTTING AND GLUING:

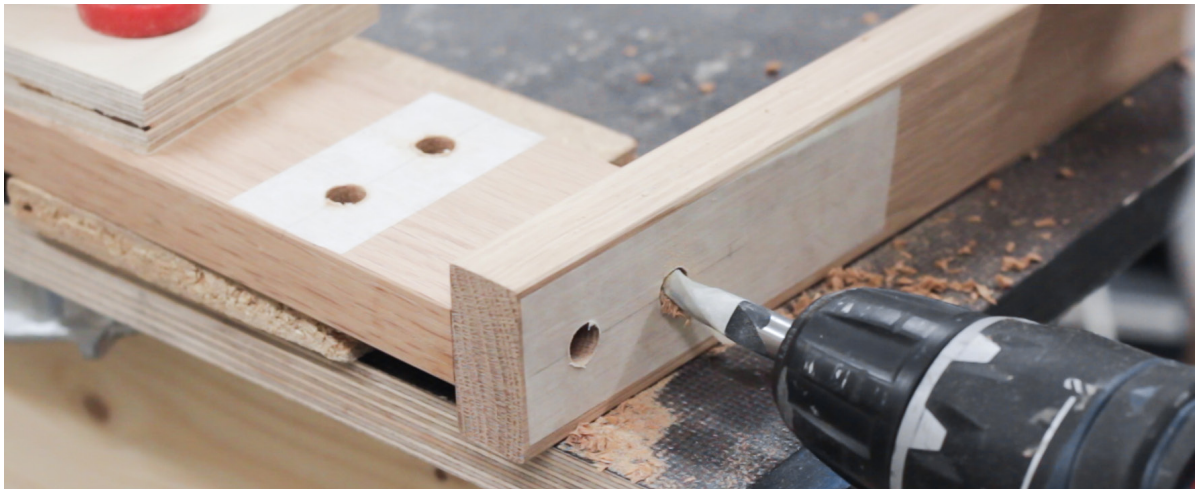
Square blocks to help with the clamping and drilling holes

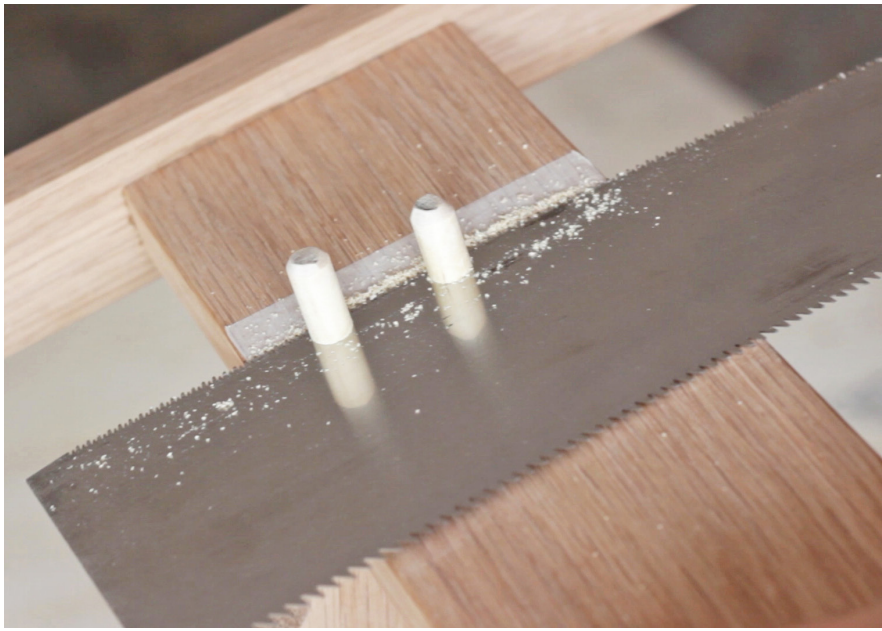
Angled blocks to help with the final glue up on the backside of the chair

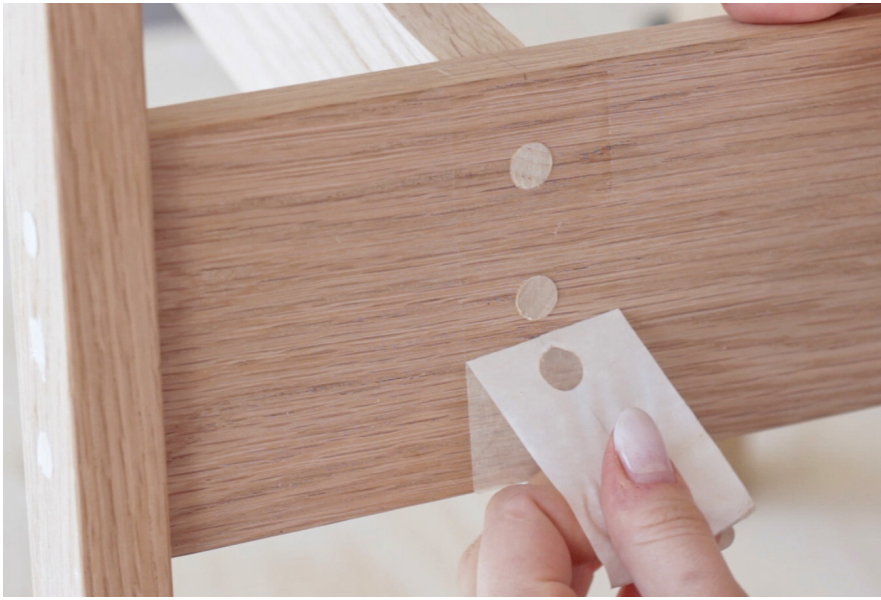
I decided to make two versions of the final prototype, one with limited tools and very affordable materials and other with more advanced tools and more expensive materials. I wanted to highlight the versatility of the design and how it could be made different ways. I made the first version out of pine and used the minimal amount of tools. The seat was made of laminated pine boards and just cut to size with the jigsaw. The second chair was made from oak and I used a table saw and a band saw in addition to the other tools I used on the first chair. The seat was glued from the same boards that made the chair frame so I had to cut them to width on the table saw before gluing. Otherwise the design of the two chairs was exactly the same.

I drilled the holes for the through dowel joints just like on the previous mock-up. I first drilled the through holes and then clamped the pieces together on the work surface. Using the drilled holes as a guide, I drilled to the adjoining part of the joint. This worked really well. This time I also applied tape on the piece before drilling the holes to keep the wood clean of any pencil markings and glue squeeze out during the glue up. I also did the glue up a bit differently. Instead of keeping the dowels long while the glue dried, I decided it was best to cut the excess dowels away before clamping the pieces together. So I applied glue to the pieces, pushed the joint together, sawed the excess dowels away and then clamped the joint. This required working fast before the glue set, but it was easier than trying to clamp the pieces together while the dowels were still long.

On both chairs the seat was attached with metal hardware that allows the wood to expand and contract with moisture. I finished the oak chair with Osmo Top Oil in the color white oak, because I liked the way it kept the wood light and natural looking and didn't make the oak yellow. I've kept the pine chair natural for now, but it would look great stained black or painted in a neutral color.



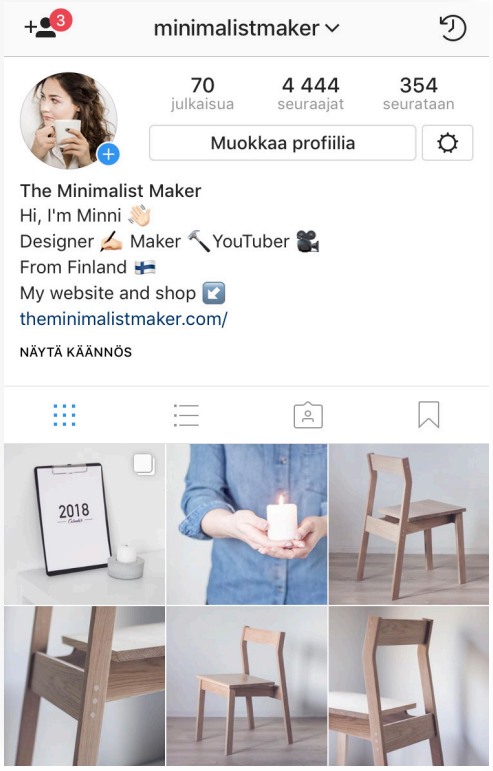


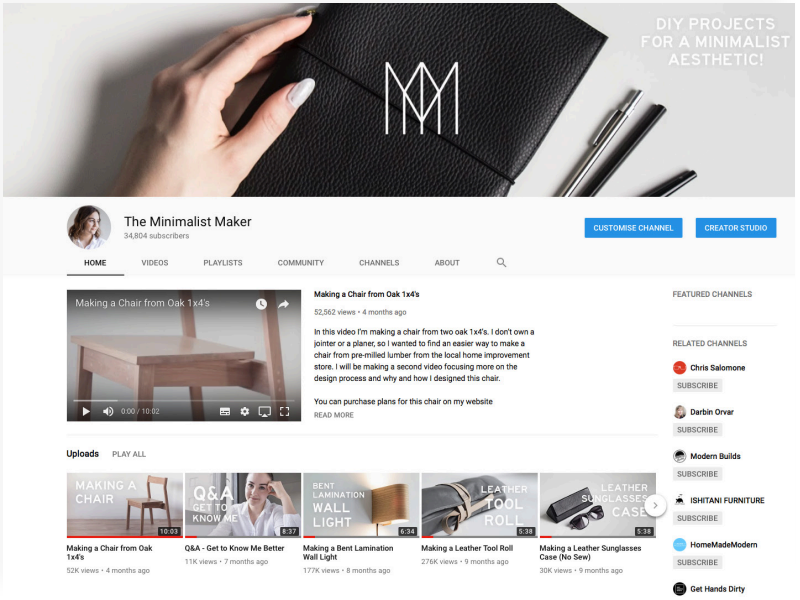


Left page
Top left: Drilling holes for through dowel joints
Bottom left: Gluing the chair together
Top right: Cutting excess dowels
Bottom right: Removing tape

This page
Left: Cleaning glue squeeze out with a chisel
Right: Attaching the seat to the frame
Below: Finishing with Osmo Top Oil

Different online platforms I shared my makeable chair on, including Instagram, Facebook, YouTube and my own website theminimalistmaker.com

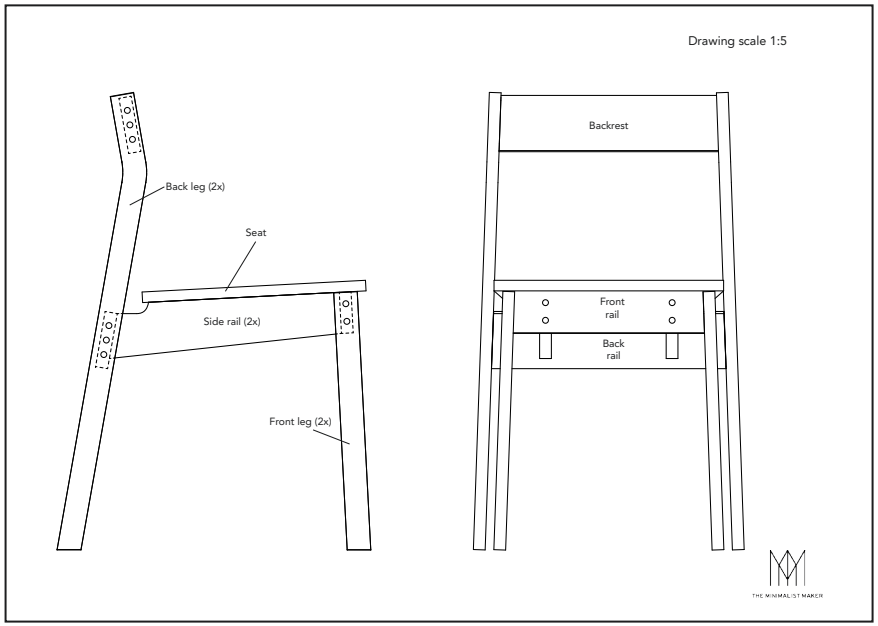


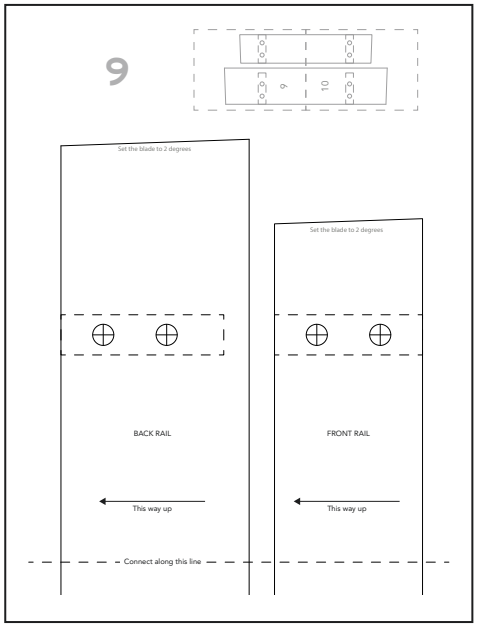


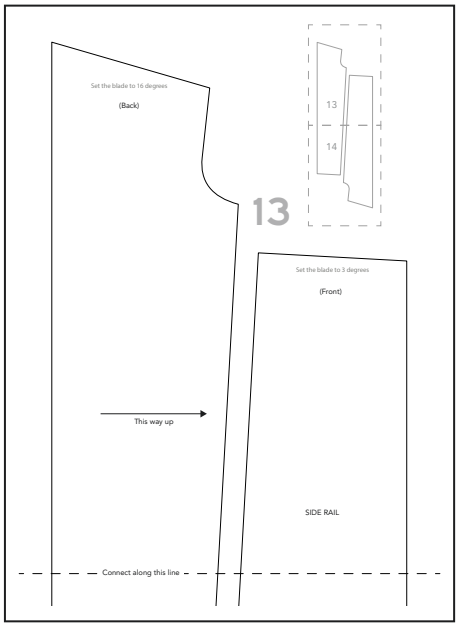
SHARING THE FINISHED CHAIR

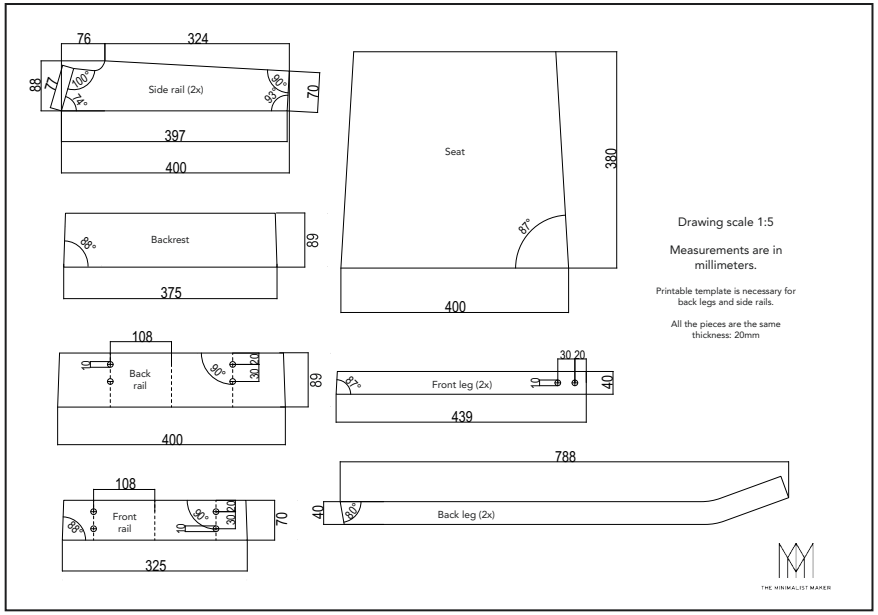
After the chairs were finished, I photographed them, edited a video of the making process for the oak chair and made printable plans for purchase on my website. I was excited to see how the finished oak chair video would perform on YouTube and on other online platforms. I'd had a lot of great feedback from all the pictures I had posted on Instagram of the making process and the finished chairs. All the Instagram posts featuring the chair received double or more likes than my other posts. Clearly the chair was interesting.

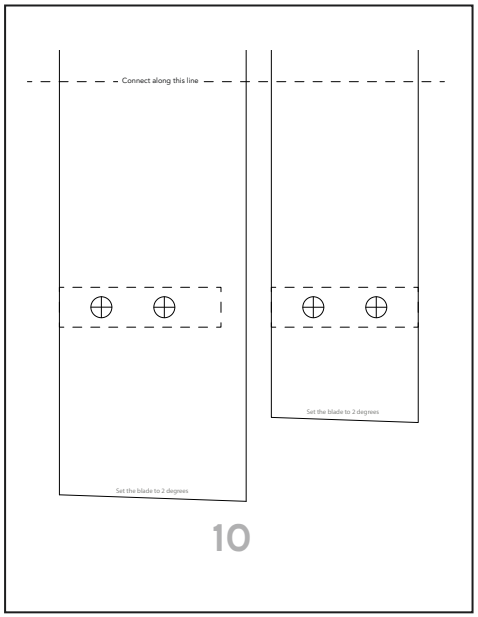
I published the video on YouTube along with other related posts on Instagram, Facebook and on my own website theminimalistmaker.com at the end of November 2017. The video views weren't as good at first as I was hoping for but eventually the views picked up a bit and the video now has over 50 000 views. It's a nice amount for a DIY project but only places fourth compared to the views of my other videos. With it being a very complex and time consuming project, I had hoped for a bigger amount of views. However, the feedback from the people who have watched the video has been amazing and they really seem to appreciate the simple design and construction. The reason for the chair video not performing as well as I had hoped might be partly because making a chair can seem difficult and intimidating. And that is probably the reason there are only a few videos of making a chair on YouTube. It might be considered a risky project to film, because it's more time consuming than, for example a coffee table video, but the views might still be lower. Solely from a YouTuber's point of view, spending a long time designing and making something that won't perform well just isn't worth the effort. But because I had other motives for this project as well, I feel that the video was definitely worth making.

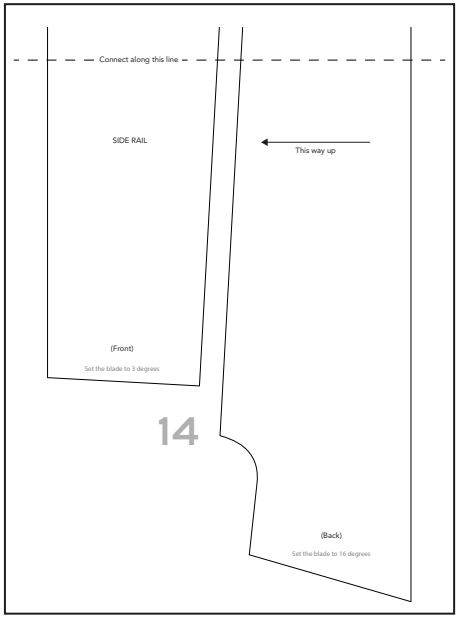

Drawing scale 1:5
Back leg (2x)
Seat
Side rail (2x)
Front leg (2x)
Backrest
Front rail
Back rail
THE MINIMALIST MAKER


9
9
10
Set the blade to 2 degrees
Set the blade to 2 degrees
BACK RAIL
FRONT RAIL
This way up
This way up
Connect along this line


Set the blade to 16 degrees
(Back)
13
14
13
Set the blade to 3 degrees
(Front)
This way up
SIDE RAIL
Connect along this line


76
324
88
17
100°
90°
83°
14°
70
Side rail (2x)
397
400
Backrest
89°
89
375
Seat
380
87°
400
108
10
Back rail
90°
30
20
89
400
87°
Front leg (2x)
10
30
20
40
439
108
Front rail
90°
89°
30
20
70
325
788
40
80°
Back leg (2x)
Drawing scale 1:5
Measurements are in millimeters.
Printable template is necessary for back legs and side rails.
All the pieces are the same thickness: 20mm
THE MINIMALIST MAKER


Connect along this line
Set the blade to 2 degrees
Set the blade to 2 degrees
10


Connect along this line
SIDE RAIL
This way up
(Front)
Set the blade to 3 degrees
14
(Back)
Set the blade to 16 degrees

In addition to publishing the video of the making process, I shared the plans for the chair on my website. Initially I thought I would give the plans away for free, but decided against it in the end. I decided to sell the plans for a small price. There was a clear reason for this, although first it may seem like it's against the DIY ethos. I appreciate the amount of work I put into designing this chair too much to just give it away for free. Although many other makers share DIY furniture plans absolutely free, they profit from the design and making process in other ways, through sponsors or monetized content. But there are so many other makers that have decided to sell DIY furniture plans to keep their livelihood more independent. Buying furniture plans is a way for people to support the designer and to compensate them for the work they have done.

I have other printable plans available for free on my website and these chair plans were the first ones I decided to sell. I assumed that selling the chair plans would dramatically reduce the amount of downloaded chair plans, but was surprised to find out that the amount of chair plans bought from my website is very close to the number of other free plans downloaded. It feels like people are happy to pay a small amount for the plans as a way of supporting me as a designer and as a way of appreciation for the work that I have done.

The plans itself are in a printable template form. I made two versions: A4 and US letter sizes, so that anyone around the world would be able to print them easily. The printable template is in a 1:1 scale, so it's ready to be used. I also provide key measurements of the parts in millimeters, so that it is easier to check that the template is correctly printed. In the template I have marked all the necessary placements for drilling holes and other additional information.

The feedback for the plans has been positive and I've already seen a couple versions of this chair made from the printable template. One of them was made with mortise and tenon joints instead of through dowel joints. One version had a leather-upholstered seat. It's interesting to see how other makers alter the plans to better fit their needs. It is exactly what DIY furniture is about: individualization.

Left page:
Some pages of the printable chair plans

EVALUATING THE FINISHED CHAIR

At the beginning of this project I chose to design a chair because it was something where I could really show my know-how and challenge myself. From the start of this project I had the idea of designing something that would be beautiful, but also easy to make with simple tools. I wanted to find a sweet spot between designs that had complicated making process but pleasing aesthetic or very simple making process with a rough and unfinished aesthetic. During the design process I had to compromise on both makeability and looks, but I still feel like I was able to achieve what I was hoping for quite well.

From makeable point of view, this chair is not the easiest projects to make, so I wouldn't call it a beginner's project. However, chairs are anyway one of the hardest pieces of furniture to design and make. My design is not the easiest DIY chair to make but I think it's easier than it might look like. All the pieces are the same thickness so they can be cut from dimensional boards easily. The shapes are simple to make and there are only a couple curves in the whole chair design: the stiles and the side rails. And the jointing technique is very easy to make but also results in a strong joint with beautiful exposed dowel ends. Of course it's not as easy as screwing a couple wooden boards together, but that was not the aesthetic I was going for in the first place, so I feel that a slightly more complicated making process is justified.

My chair design is also customizable according to the tools and materials available to the maker. For example, if the maker has limited tools, the chair seat could be made with laminated

Left page:
The finished oak chair

wood panels instead of gluing it together from individual boards. But if the maker has more advanced tools and machines, the chair can be made from rough-sawn lumber just as well. The material choice is also for the maker to decide. It can be made from affordable pine or more expensive hardwoods and even 18mm thick plywood. This chair could even be altered so that the parts could be cut on a CNC machine. The maker can decide how much the chair materials will cost by choosing the material best suited for them. This customizability is a very essential part of DIY furniture. The maker can make the chair their own by tweaking and altering it to their preferences.

Ergonomically, I think the chair is relatively comfortable. Adding bigger chamfers or round overs to the front of the seat and to the backrest would make sitting longer periods of time more comfortable. The backrest could even be made a bit wider to offer more support to the back. For my final chair I made a small chamfer on the edges with a hand plane so they wouldn't be too sharp. I left the backrest as narrow as the 1x4 board I was using. Again, the maker of this chair can modify the chair to their needs and make it more comfortable if they choose to.

From aesthetic point of view, my finished chair is quite minimalistic and simple in style. It doesn't have many details or curved parts. At first glance it might look like a very basic general-purpose chair. But looking at it closer I think that all the effort I put into designing it can be seen from the proportions and the balance of the chair. I don't think anything stands out in a negative way and the chair looks good from all sides. I wanted to design a DIY chair that didn't look like a DIY chair: a makeable design chair. I think I was able to achieve that goal.

Right page
Left: Detail of the through dowel joints
Right: The finished oak chair, back view

CONCLUSION

"We may make things because we enjoy the process, but our underlying intent, inevitably, is self-transformation." (Korn 2015, p. 104)

The purpose of this thesis has been to explore the idea of creating and sharing makeable design. Making and creating, once a vital part of human survival, have become obsolete due to the industrialization at the end of 1800's. Consequently a movement with opposite ideals started to form. This movement emphasized the importance of individual creativity and later morphed into what we call DIY culture today.

In recent decades DIY culture has been widely adopted due to the emergence of online sharing mechanisms and social media. Anybody can share their projects on the Internet to inspire others and to get feedback and assistance from around the world. Global online sharing has also changed DIY projects from a personal hobby to a way to earn a living for some makers.

But the core ideals of DIY culture are still the same: to promote self-sufficiency and creativity. Making things makes people happy and fulfilled and they see their own DIY projects more valuable than store-bought items.

I wanted to create makeable design where the manufacturer of the piece is also the end user.

I wanted to offer a second option for store-bought furniture and add beautiful and well-designed piece to the available selection of DIY furniture. I also wanted to inspire people to make more, because I know personally how fulfilling making things is.

Through documenting my process I designed a general-purpose chair that can be made with simple materials from the hardware store and basic tools, such as a battery powered drill, a miter saw, a jigsaw and an orbital sander. These tools are common for people interested in do-it-yourself projects or woodworking. The design is simple but also makes small tweaking and individual design changes possible.

Part of this project was to share it through different online networks and social media. I believe that sharing is a vital part of today's DIY culture. We learn and get inspiration from the shared information and we can connect with others by sharing our own projects online. I shared the making process and the finished chair in a YouTube video and on my other social media accounts. The YouTube video has performed relatively well and as a result I have witnessed others make the chair I designed and also modify it to their personal preferences. This proves that I was able to achieve what I set out to do in the beginning: create and share makeable design.

There's an other important message I want to express through makeable design. I want people to find the joy and satisfaction of making things again. While I know that only a few will actually make the chair I designed, I still think sharing the making process to the world can inspire people to create their own DIY projects. By making things we can create new things, change our surroundings and ultimately even transform ourselves.

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Fluted Coffee Table by author, walnut and maple, 15x38x16 inches, 2008. Photo by Jim Dugan.

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MAKEABLE DESIGN

DESIGNING AND SHARING DIY FURNITURE

Minni Sirelä

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